



# Standing Committee on Upgrade Installation-to-Physics Commissioning "SC-IPC"

Co Chairs: C. Gerber, R. Smith



# Charge and Goals for SC-IPC

- Recognizing that “the upgrade trigger, DAQ/online, and silicon sub-projects must be installed and commissioned in a manner that to the greatest extent possible minimizes the total downtime of the experiment”...

The DO spokespersons have convened a Standing Committee on Upgrade Installation-to-Physics (SC-IPC) to generate a detailed plan which describes and quantifies the impact the installation and commissioning to physics the upgrade will have on the experiment and the laboratory



# Deliverables of the SC-IPC

---

- Task breakdown, Timeline, plus Resources(effort types), Costs (MS Project ultimately needed)
- Periodic reports to Collaboration at various fora (e.g. Collaboration Meetings, ADM's, etc.)
- Written report updated and presented periodically ( $\tau = 3-4$  months) which summarizes findings



# SC-IPC Resources and Tools

---

- 14 Physicists presently engaged in the Upgrade or familiar with RunIIa commissioning and beyond
- Webpage:  
<http://d0server1.fnal.gov/projects/run2b/SC-IPC/Index.html>
- Listserver: [d0scipc@fnal.gov](mailto:d0scipc@fnal.gov)
- Agenda Server: RunI Ib Upgrade>>Installation to Physics



# SC-IPC Organization

---

- 5 Working Groups:
  - ◆ WG1: L1 Cal trig (K. Johns + Barberis, Buescher, Hirosky)
  - ◆ WG2: L1 Cal trackmatch & CTT (S. Gruenendahl + Johns, Watts, Quinn)
  - ◆ WG3: L2 Beta, STT expansion (B. Hirosky + Jesik, Watts, Yasuda)
  - ◆ WG4: Trigsim (J. Hays + Shabalina, Buescher, Jesik, Kajfasz, vonToerne)
  - ◆ WG5: Layer 0 (B. Quinn + Barberis, Cooper, Kajfasz, Shabalina, Yasuda, von Toerne)
  - ◆ WG6: AFEII not yet convened (wait until accepted by DO)
  - ◆ Online covered by Committee as a whole



# Suggestions for WG Leaders

- Provide Task Itemization and Description:

Task	Skill Level Assumed	Time Required	Is Named Person Fungible?
Download GUI	J. Warchol	One Week	e.g. FNAL CD Hireling?





# L1 Cal Trigger

---

- Step A (Bench testing)
  - ◆ Will assume hardware deliverables and bench testing follows the current project schedule
  - ◆ An important milestone to watch is the start date of ADF production in Fall 2004



# L1 Cal Trigger

- Step B (Pre-commissioning using preproduction electronics in Test Area)
  - ◆ Use splitter signals (currently 4x2) from BLS sent to Test Area located outside MCH1
  - ◆ Can also use TWG (Test Waveform Generator)
  - ◆ Goals
    - ▲ Verify operation of preproduction cards
    - ▲ Begin hardware and software integration into experiment (L1, L2, L3)
    - ▲ Begin digital filter, trigger, rate, noise studies
    - ▲ Begin building infrastructure (populated racks) that will eventually move into MCH1





# L1 Cal Trigger

- Step C (Pre-commissioning using production electronics in Test Area)
  - ◆ Use additional splitter signals (4x4x2) from BLS sent to Test Area located outside MCH1
    - ▲ Sliding windows algorithms must be tested by other means
  - ◆ Goals
    - ▲ Verify operation of production cards
    - ▲ Complete hardware and software integration into experiment
    - ▲ Complete infrastructure (fully populated racks) that will eventually move into MCH1
    - ▲ Complete digital filter, trigger, rate, noise studies



# L1 Cal Trigger

---

- Step D (Installation in MCH1)
  - ◆ Remove racks/hardware in MCH1 and replace with racks/hardware in Test Area during 2005 ~12w shutdown
  - ◆ Big cabling job
  - ◆ Significant tech support required for service installation (double shifts)
  - ◆ UIC responsibility



# L1 Cal Trigger

---

- Step E (Final commissioning)
  - ◆ Intensive period of understanding the new L1Cal trigger
    - ▲ Noise studies
    - ▲ Tuning of digital filter coefficients
    - ▲ Determination of threshold reference sets
    - ▲ Understanding data collected with new L1Cal and L1CalTrack triggers
    - ▲ Understanding missing  $E_t$
    - ▲ Return to data-taking with high efficiency



# L1 Cal Trigger

- Other areas that are important to successful and timely commissioning
  - ♦ L1Cal simulation leading to AND/OR terms (Northeastern)
  - ♦ D0Sim of ADF
  - ♦ Offline software
    - ▲ Easy access to L1Cal, precision readout, D0Reco variables in one root-tuple
  - ♦ L2Cal??



# Layer Zero

Task description	Lead Person (support)	Time	Availability
<b>Modify Runlla online silicon software</b>			
Download	Buchholz		
Calibration	Burdin		Yes
Other online controls			
<b>Modify Runlla offline silicon software</b>		42 w	
Simulation	Chabalina		No
Unpacking and calibration	Kulik,Zdrazil		No
Cluster reconstruction	Barberis,Kulik		No
Track reconstruction	Kulik,Khanov,Borrisov		Borrisov partially
Monitoring (Examine,Display)	Chabalina,Hesketh,Dean		No
L3 algorithms	Illingsworth, Whiteson		No
<b>Pre-installation activiites</b>			
Remap HV	Quinn	0.6 w	Yes
Install additional HV	Quinn	1.0 w	Maybe, or Prague personnel
Survey beam pipe clearances			



# Layer Zero

Task description	Lead Person (support)	Time	Availability
<b>Technical commissioning of detector</b>			
Demonstrate full operability of all channels from Control Room.	Numeroski (SMT Postdocs/Grad Students)	1.0 w	
Silicon ready for resumption of Tevatron operation			
<b>Commissioning online readout software, close detector</b>			
Verify functionality of all SMT software	?	2.0 w	?
Close calorimeter and muon system, survey detector	Rucinski (Smith, Cooper, alignment group)	0.8 w	Yes, except alignment group availability remains to be verified
<b>Silicon system ready for physics commissioning</b>			
<b>Physics commissioning</b>		20 w	
Perform calibrations	Burdin/Harder	4.0 w	Current SMT operations leader
Timing In		1.0 w	
Clustering studies	Khanov,Kulik	8.0 w	No
Tracking studies	Zdrazil	8.0 w	No
Noise studies	Kajfasz	8.0 w	
Alignment	Sorin, Borrisov	4.0 w	Borrisov partially
Physics analysis (J/psi, Ks, etc.)			

RP Smith

Fresno IB, June 11, 2004



## Layer Zero: Other

---

- SMT/LO Group Integration
  - Determine what tasks should be joint
    - Avoid duplicated and divergent efforts
    - Avoid tasks falling through the cracks
- Software/Physics Commissioning leadership
  - Very closely tied but distinct efforts
  - One or two individuals?
  - Where should they be placed?
  - Need consensus from LO/SMT/Tracking



# L2 Beta, STT: Software Main Challenge

- New calorimeter data formats/algorithms  
(must start now)  
piece into simulator, prepare algorithms for run2b  
(~1 year FTE, assuming EM/JET/MET)  
UIC student                      Status: not started
- Versioning
  - Right now—hand work when formats change
  - Eventually: commissioning of L1Cal for IIb
    - Best: add apprentice to Roger MooreComplex code. Probably ~ 6 mo learning curve/development  
Status: not assigned
- TMB with new objects (Will need Marco's assistance)  
keep up w/ changes to data
- Bit-level verification (history/mem bugs)





# L2 Algorithms in Upgrade?

- 1) More complex L2Global scripts
  - Phi wrt MET
  - NN Tau ID with L1 input objects, ...
- 2) Few-cm Zvtx (from barrels on SMT)?
  - Study of algorithm!!
  - In worst case: physics dependent
  - Ideally: use to correct Et(cal), MET
- 3) New PP tools: Try for multiple-track displaced vertices???, Fancier CPS/FPS algorithms?, cleanup MET at L2, put L3 algo here?, etc...
- 4) Advanced plans for L2 cal:
  - Tower by tower calibrations of L1 cal tower ET's
  - Easier to change than L1cal gains?
- 5) If cal. readout is upgraded: Can we get more precise calorimeter data?  
(do we want it?)



# Conclusions

---

- Draft Interim Report in Circulation
- Much Work Remains for first Interim Report:
  - ◆ Organize Tasks, Effort input from each Working Group
  - ◆ Establish timelines of each Working Group
  - ◆ Synthesis of Material of Working Groups
  - ◆ Extend existing Schedule to Physics Commissioning
  - ◆ Augment existing Schedule "Infrastructure" tasks
  - ◆ Rely on L2/L3 Managers to find boundary between existing Upgrade Project and IPC
  - ◆ Extract physicist effort summaries for Collaboration